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ABSTRACT

This paper examines the relationships between the structure of internal labor markets and the mobility, experience, and income of workers. The author discusses the taxonomy of the markets and the predicted differential impact of experience. Internal labor markets are classified according to the assumption that structure is related to mobility. In manorial structure, vertical stratification and ports of entry imply that a worker is likely to remain with the firm. In guild structures, which are usually highly unionized, horizontal movement between firms is expected to be high. The open market is unstructured and competitive. Manorial firms provide training specific to the firm. Guild structures usually employ skilled craftsmen whose skills are related to the industry rather than the firm. The unstructured market is characterized by the absence of skills and investment in the employee. Data used in this study were derived from the Social Security Administration work history file. Equations and graphs were constructed to display the results of the study. (MF)

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# INCOME, EXPERIENCE, AND THE STRUCTURE OF INTERNAL LABOR MARKETS

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# INCOME, EXPERIENCE, AND THE STRUCTURE OF INTERNAL LABOR MARKETS

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## I. INTERNAL LABOR MARKETS

This paper examines the relationships between the structure of internal labor markets and the mobility, experience, and income of workers. The first section discusses the taxonomy of internal labor markets and the predicted differential impact of experience. Section II classifies industries into three types of structures according to the degree of firm and industry mobility. The relationships between income and experience across structures and income classes are examined in Section III.

Classical economics conceived of labor markets as being highly competitive. Each worker competed with all other workers for jobs, and each employer competed for workers. By the late nineteenth century Cairnes and Mill had described labor markets as a set of "non-competing groups" bounded by geographic, occupational, and institutional forces. Present-day writers have extended the taxonomy and analysis to systems called internal labor markets that are confined to the establishment, the firm, or the industry.

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The major distinction between the classical (open, unstructured) markets and the internal (closed, structured) markets is the different treatment accorded to the "ins" and "outs." Clark Kerr writes, "In the structureless market there is no attachment except the wage between the worker and the employer. No worker has any claim on any job and no employer has any hold on any man."[1] Structured markets, in contrast, are "specifically delimited, and entrance into them, movement within them, and exit from them are precisely defined."[2]

Internal markets have been classified according to different schemes. Kerr draws a three-way classification among "open," "guild," and "manorial" markets.[3] The open market is the unstructured, competitive type.[4] Guild-type markets are stratified horizontally. Guild systems tend to predominate in skilled crafts that are highly unionized. Workers remain within an industry or craft, but move freely from firm to firm so long as they have the proper credentials. Admission of outsiders into the guild system is often closely controlled through training and other requirements, thus preserving the domain of those inside the guild. Manorial markets emphasize attachment to the place of work and vertical stratification. The job "belongs" to the man holding it. Ports of entry are few and usually confined to the lower job classification. Movement takes place vertically along the job ladder and seniority governs layoffs and other movements within and

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[1] Clark Kerr, "The Balkanization of Labor Markets," in E. Wight Bakke, et al., Labor Mobility and Economic Opportunity, Technology Press, 1954, p. 101n.

[2] Ibid., p. 96.

[3] Ibid., p. 105.

[4] Peter Doeringer describes two polar cases that he names the "closed" and "open" markets. Closed markets have a single port of entry from the external market. The port of entry is at the lowest level of the promotion ladder. Other openings in the closed market are filled internally by promotion of workers already in the system. In open markets, all job openings are filled directly from the outside. P. B. Doeringer, "Determinants of the Structure of Industrial Type Internal Labor Markets," Industrial and Labor Relations Review, Vol. 20, No. 2, January 1967, p. 209.

outside the system. Kerr's taxonomy of unstructured, manorial, and guild markets is the classifying scheme that will be used in the rest of this paper.

A commonly cited rationale for the existence of the several types of internal labor markets is based on the predominant on-the-job training patterns within the firm or industry. In this paper I examine the relationship between structure and training through the evidence provided by the relationship between income and experience. The internal labor market literature discusses many of these relationships.

In manorial firms, firm-specific training[1] is thought likely to be important.[2] Since the increased productivity is of no value to other firms, the wage rate will not be bid up by other employers. But because the firm's investment in the employee has a better chance of being amortized the longer the employee stays with the firm, there is an incentive to reduce mobility by paying the employee somewhat more than his competitive value. Technology is claimed to be one of the chief determinants of firm-specific training in manorial type structures. It has been said, for example, that plants "mold men to jobs, not jobs to men."[3] The molds are cast by production processes and machinery; a steel mill, chemical plant, or oil refinery determines the tasks to be performed, largely independently of labor force supply characteristics. Case studies indicate that production technology is often neither formally described nor well understood.[4] Experience with the

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[1] Training is specific to the firm when it increases productivity only in the firms that provide the training.

[2] Doeringer, op. cit., pp. 209-210. Also, Doeringer, Peter B. and Michael J. Piore, "Labor Market Adjustment and Internal Training" in Industrial Relations Research Association, Proceedings of the Eighteenth Annual Winter Meeting, G. G. Somers (ed.), 1965, pp. 250-251; and M. J. Piore, "The Impact of the Labor Market Upon the Design and Selection of Productive Techniques Within the Manufacturing Plant," Quarterly Journal of Economics, Vol. 82, No. 4, November 1968, p. 605.

[3] Piore, op. cit., p. 619.

[4] Ibid., p. 605.

specific technology in a plant is then firm-specific as the idiosyncracies of each plant generate training that has value only within the plant. Well-developed promotion ladders often reflect the gradual accumulation of this type of human capital.

Guild structures are typically occupied by employees with recognized craft-like skills. Once the skills are acquired and certified, productivity increases are not firm-specific, but are more likely related to industry experience. Consequently, the worker's ties are to the craft or industry rather than to the firm. However, when training in guild industries takes place during an early apprenticeship-like period, additional experience gained on the job is relatively unimportant.

The unstructured market is characterized by the absence of skills and the lack of capital and machinery.[1] There is little firm-specific investment by the firm in the employee, and little experience gained by the employee that binds him to firm or industry. "The only nexus," says Kerr, "is cash."[2]

## II. CLASSIFYING INTERNAL LABOR MARKETS

In order to examine the relationships between structure and training, a measure is required that will allow us to classify internal labor markets. Most of the previous research in this area has been based on case studies in which an industry has been intensively analyzed and subjectively classified. One of the goals of the present work is to develop classification criteria of structures, based on objective and comprehensive data, that are consistent with the results of the case studies.

The central assumption behind our classification scheme is that structure is related to mobility. In particular, a relatively low probability of an employee leaving a firm characterizes manorial

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[1] Kerr, op. cit., p. 95.

[2] Ibid., p. 95.

structure; a relatively high probability of leaving the firm and industry is a measure of unstructured markets; and a large positive difference between the probability of leaving the firm and the probability of leaving the industry is associated with guild structures.

In manorial structures, the very notions of vertical stratification and ports of entry imply that an individual is more likely to remain within the firm than he would be in an unstructured system. Protection against layoffs, promotion rights, seniority rules, and pension plans reduce the probability of a manorial worker leaving the firm. The somewhat higher than competitive wage derived from firm-specific training would also lead to lower mobility. When a manorial worker leaves an employer, there is no special incentive for him to remain within the industry, especially since he would have to go to the bottom of the ladder in another firm. In contrast, workers in unstructured internal labor markets (in the extreme case) are equivalent to those in the external market. Each employment decision is, in essence, made without consideration of the present state of the individual.

In guild structures, movement between firms is expected to be high; most of this movement, however, takes place within an occupation or industry. The credentials of the guild worker give him free entry without penalty to firms requiring his specialty. However, there is a strong penalty for his leaving the guild in that the rights and privileges of the guild are given up.

The main source of data used in this study allows one to measure explicitly experience within a firm, experience within an industry, and the general experience associated with age. This source is the Social Security 1-percent work history file. This file is compiled by the Social Security Administration as a random sample of active members of the Social Security system and contains information on approximately one million individuals. Ten consecutive years of information (1957-1966) were available for analysis. From the 1-percent file a 10-percent random sample was generated. This sample was further reduced to males, 20 to 60 years old in 1965, with income from at least

one employer in the first quarter of 1965 exceeding $500.00.[1] Finally, workers in agriculture, city, state, and local government, and four-digit S.I.C. industries with less than 40 observations were excluded. This "large" sample included somewhat more than 16,000 individuals in 136 industries.

An individual's employer was defined as the employer from which he received the largest amount of income in the first quarter of 1965. The industry of employment was taken as the S.I.C. four-digit industry classification associated with the employer as defined above. An individual was considered as having left the firm if, in the first quarter of 1966, he received no income from his 1965 employer. Similarly, he left the industry if he was unassociated with his 1965 industry (through any employer) in 1966. Average firm mobility for an industry is defined as the proportion of workers in an industry who left their firms between the first quarter of 1965 and the first quarter of 1966. Industry mobility is the proportion of an industry who left that industry.

In order to accentuate the differences between structures as much as possible, only the most manorial, the most guild-like, and the least structured industries were chosen for most of the statistical analysis; and in order to reduce the effects of variations in racial composition, this shortened sample was confined to whites. This "small" sample was composed of more than 8,900 white males from 79 four-digit S.I.C. industries.

An industry was classified as "manorial" if firm mobility was less than 10 percent. "Guild" industries had firm mobility minus industry mobility greater than 10 percent. If firm mobility was greater than 20 percent and if the industry was not classified as guild, it was "unstructured." Table 1 shows the industries classified by structure.

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[1] This requirement was intended to exclude part-time and casual labor. It may have the effect, however, of excluding those guild-type employees with numerous employers.

Table 1

CLASSIFICATION OF INDUSTRIES BY STRUCTURAL CATEGORIES

| S.I.C. Code | Industry Name | S.I.C. Code | Industry Name | S.I.C. Code | Industry Name |
|---|---|---|---|---|---|
| | | | MANORIAL | | |
| 1925 | Missiles and space vehicles | 3411 | Metal cans | 3722 | Aircraft engines |
| 2621 | Paper mills | 3562 | Ball and roller bearings | 4465 | Marine cargo handling |
| 2818 | Industrial organic chemicals | 3621 | Electric motors and generators | 4511 | Air transportation |
| 2819 | Industrial inorganic chemicals | 3632 | Household refrigerators | 4811 | Telephone communications |
| 2824 | Synthetic organic fibers | 3711 | Motor vehicles | 4911 | Electric companies |
| 2911 | Petroleum refining | 3712 | Passenger car bodies | 4921 | Gas companies |
| 3011 | Tires and tubes | 3714 | Motor vehicle parts | 4931 | Combined utilities |
| 3312 | Blast furnaces and steel plants | | | | |
| | | | GUILD | | |
| 1321 | Oil and gas drilling | 1742 | Plastering and lathing contractors | 5541 | Gasoline stations |
| 1511 | General building contractors | 1761 | Roofing and sheet metal contractors | 5611 | Mens and boys clothing stores |
| 1611 | Highway construction | 2631 | Paperboard mills | 5811 | Eating and drinking places |
| 1621 | Heavy construction | 2752 | Commercial printing | 6141 | Personal credit institutions |
| 1711 | Plumbing, heating, air cond. contractors | 4411 | Deep-sea transportation | 7011 | Hotels and motels |
| 1721 | Painting and papering contractors | 4831 | Radio and TV broadcasting | 7216 | Cleaning and dyeing plants |
| 1731 | Electrical contractors | 5093 | Scrap and waste, wholesale | 7241 | Barber shops |
| 1741 | Masonry contractors | 5511 | Motor vehicle dealers | 8911 | Engineers and architects |
| | | | UNSTRUCTURED | | |
| 1751 | Carpentering | 3321 | Gray iron foundries | 5311 | Department stores |
| 1771 | Concrete work | 3441 | Fabricated structural steel | 5411 | Grocery stores |
| 2051 | Bakeries | 3444 | Sheet metal work | 5531 | Automotive accessory stores |
| 2086 | Bottled and canned soft drinks | 5013 | Automotive equipment, wholesale | 5661 | Shoe stores |
| 2421 | Sawmills | 5022 | Drugs, wholesale | 5712 | Furniture stores |
| 2431 | Millwork plants | 5047 | Meat, wholesale | 5912 | Drug stores |
| 2511 | Wood household furniture, unupholstered | 5092 | Petroleum bulk stations | 6511 | Real estate operators |
| 2512 | Wood household furniture, upholstered | 5097 | Furniture, wholesale | 7392 | Business and management consultants |
| 2653 | Fiber boxes | 5122 | Lumber and building materials, retail | 7538 | Automobile repair shops |
| 2851 | Paints and varnishes | 5251 | Hardware, retail | 8061 | Hospitals |
| 3141 | Footwear | 5252 | Farm equipment, retail | | |

Notes:

Manorial: Firm mobility less than 10 percent.

Guild: Firm mobility minus industry mobility greater than 10 percent.

Unstructured: Firm mobility greater than 20 percent, and not guild.

S.I.C. codes and names taken from: Social Security Administration, Division of Research and Statistics, Comparison of Social Security Administration and Standard Industrial Classification Coding Systems, 1963.

Classifications of industries made by independent observers may be used to test the results of the present scheme. Doeringer rates steel, chemicals, and petroleum as notable examples of manorial industries.[1] They appear in our manorial group. Kerr describes the building, printing, maritime, and teamster trades as being most guildlike.[2] This agrees with the classification of Table 1, except for teamsters who just fail to be classified as guildlike with a difference between firm and industry mobility of 9 percent.

Mobility differences between industries can be decomposed into two components: labor force composition effects and direct structural effects. It is well established that younger, less experienced, lower paid workers are the most mobile. The unstructured industries are heavily weighted with people of this type, and the reverse is true of the manorial industries.[3] But, in addition to employing various proportions of mobile individuals, structure itself can have an impact on mobility. In order to determine the relative weights of the mobility components, an equation to predict firm mobility, based on employee attributes, was estimated.

Mobility is basically part of a larger system of equations that can be shown as follows:

$$(1) \qquad M = f(A,Y,F,X)$$

$$(2) \qquad F = g(A,Y,M,Z)$$

$$(3) \qquad Y = h(A,F,W)$$

where M is the probability of moving from the firm (firm mobility), A is age, Y is income, F is firm experience, and X,Z, and W are vectors of exogenous variables. M,F,Y are endogenously determined.

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[1] Doeringer, op. cit., p. 210.

[2] Kerr, op. cit., p. 97.

[3] In the manorial industries, 23 percent are between the ages of 20 and 30, compared to 32 percent in unstructured industries. Median years of firm experience is over 8 in manorial and 4 in unstructured industries.

Both ordinary least squares (OLS) and two-stage least squares (2 SLS) were investigated. Firm experience was estimated by instruments and the estimate was substituted in equation (1).[1] The 2 SLS estimates of mobility barely differed from the OLS estimates, so only the OLS results will be discussed. The equation had all the independent variables entered as 0-1 dummies. The dependent variable was also a binary variable that was zero if the individual stayed with the firm from 1965 to 1966 and one if he moved.[2] The equation thus had the following form:

$$M = a_o + \Sigma b_i A_i + \Sigma\Sigma c_{jk} Y_k F_k + \Sigma d_l I_l + \Sigma e_r S_m + \Sigma f_n R_n$$

where M is defined above, A is age, Y is income, F is firm experience,[3] I is industry experience outside the firm, S is firm size, and R is percent change in income from 1964 to 1965. The cross-effect of income and firm experience is allowed for by entering their cross products. The subscripts refer to discrete values of the variables. Thus, $A_2$ is 25-30 years old, $F_2$ is 2 years' experience in the firm, etc. Entering the variables in this manner frees one from having to specify a particular functional form. The coefficients of the estimated equation are plotted in Figure 1 and are listed in the Appendix.

The mobility of each individual as calculated from the equation and averaged for each structural class is shown in Table 2. It is clear from Table 2 that both manorial and guild structures influence mobility beyond what may be expected from the characteristics of the

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[1] The instruments used in estimating equation (2) were age, geographical region, and firm size.

[2] An equation with a binary dependent variable can be interpreted as a linear probability function with the estimated value of the dependent variable being the conditional probability that the specified event (mobility) occurs, given the values of the independent variables.

[3] Years of experience with a firm or industry was calculated by counting backward from 1965 the number of consecutive years (up to nine) in which the employee received any income from his 1965 firm or industry. Industry experience outside the firm was calculated by subtracting firm experience from total industry experience.

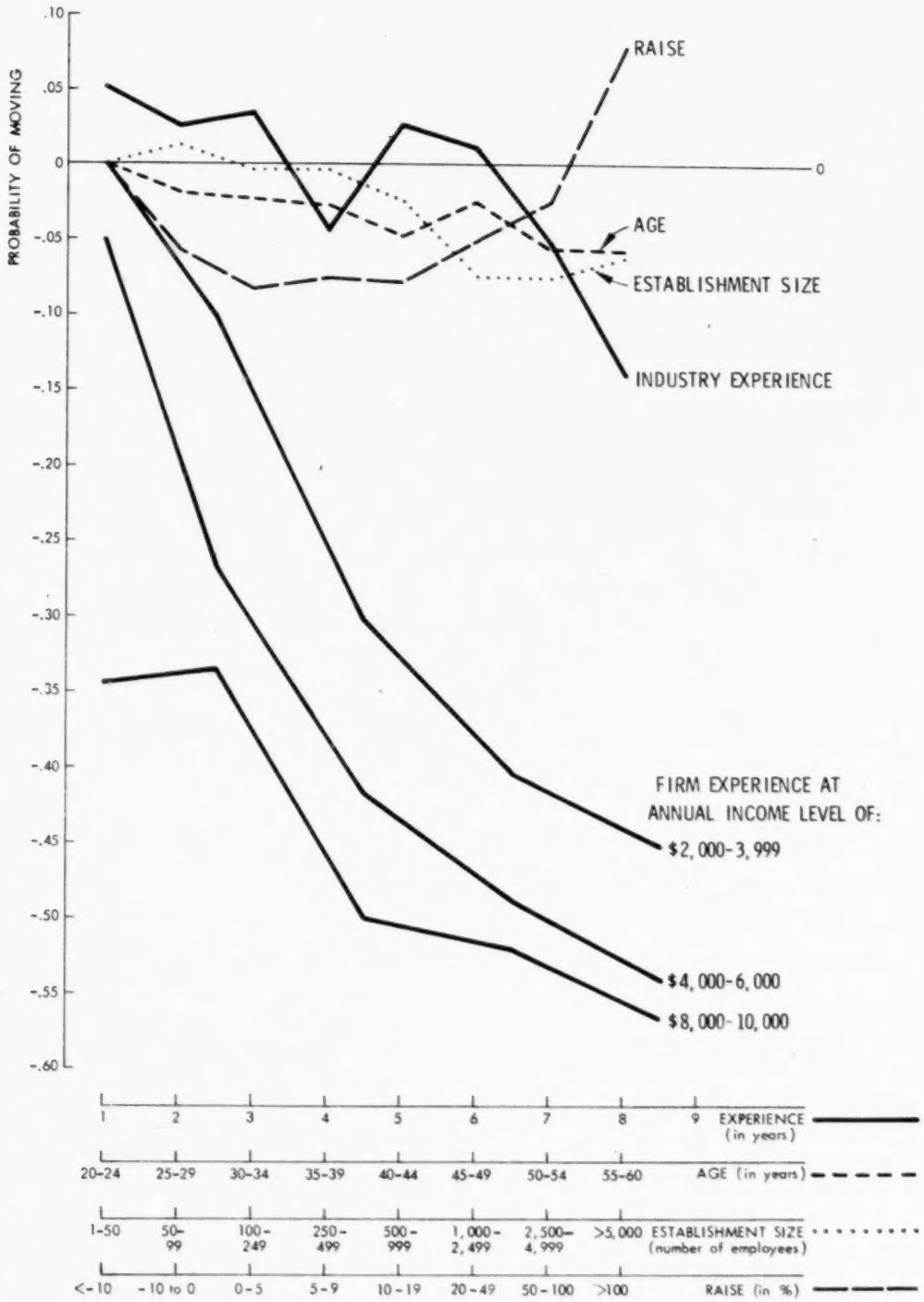


Figure 1. Determinants of firm mobility.

labor force. Manorial industries reduce firm mobility by almost seven percentage points, and guild industries increase it by the same amount. Mobility of workers in the unstructured class of industries is little affected by structure.

Table 2

ACTUAL AND PREDICTED FIRM MOBILITY BY STRUCTURE

| Structure | Actual Firm Mobility (percentage) | Predicted Firm Mobility (percentage) |
|---|---|---|
| Manorial | 6.1 | 13.1 |
| Unstructured | 22.5 | 23.4 |
| Guild | 33.6 | 27.3 |

The striking feature of the mobility equation is the relatively minor importance of age. Firm experience, when entered explicitly into the equation, sharply reduces the impact of age.[1] This result is in disagreement with virtually all other empirical studies of mobility. The present study, however, in contrast to almost all others, is able to include a direct measure of firm experience. Note also that mobility falls sharply with experience for the lower income groups, but less sharply as income rises. This result most likely derives from variations in job training patterns, which are discussed in the next section.

It has been conjectured that manorial structure depends partly on technology. To test this hypothesis, the 58 S.I.C. four-digit manufacturing industries in the large sample were analyzed, with each industry as a separate observation. Differences in industry characteristics were emphasized by selecting for initial analysis the ten industries with highest firm stability[2] and the ten industries with the lowest.

[1] The simple correlation between age and firm experience (in continuous form) is only .35.

[2] Stability is defined as the complement of mobility.

The most stable industries can be identified with the most manorial structures and, in the manufacturing sector, the least stable with the most unstructured. Value added minus wages per employee and investment per employee were taken as proxies for capital intensity. In addition, industry concentration and average firm size were investigated. Table 3 displays the results. Value added minus wages per employee is more than twice as large in the manorial as compared to the unstructured industries. Investment is almost five times as large. Firms in structured industries were ten times larger. Average four-firm concentration ratio was almost four times the unstructured concentration. Growth of value added was a third larger. It is evident from these figures that structure (stability) is related to production technology. Also, stability is related to industry concentration and firm size, but since concentration and size are both partially dependent on production technology, the independent influences are masked in single variable analysis. Therefore, multiple regressions with the full 58 industry sample were investigated. The "best" equation is:

$$S = 71.4 + \underset{(5.47)}{.15C} + \underset{(2.61)}{1.01K} + \underset{(2.43)}{1.04Y} \; ; \quad R^2 = .64$$

where S is average firm stability for the industry (percentage), C is the four-firm concentration ratio (percentage), K is investment per employee (thousands), Y is average annual wage income per employee (thousands), and t statistics are in parenthesis.[1] Concentration performed somewhat better in the regression than did average firm size, and investment did better than value added minus wages per employee. If we accept the supposition that stability is association with manorial structure, the regression shows that <u>both</u> concentration (or size) and capital intensity contribute to structure.

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[1] Sample means are: S = 84.9; C = 34.1; K = 1.33; Y = 6.695.

Table 3

STATISTICS ON MANUFACTURING INDUSTRIES WITH HIGHEST AND LOWEST FIRM STABILITY[a]

| Industry Variables | Ten Most Stable Industries | Ten Least Stable Industries |
|---|---|---|
| Concentration ratio (four-firm) | 60.8 | 16.1 |
| Value added per firm (million $) | 81.4 | 4.7 |
| Value added minus wages per employee ($) | 13,876 | 4,964 |
| Investment per employee ($) | 3,061 | 651 |
| Employees per firm | 825 | 82 |
| Income per employee ($/yr) | 7,748 | 5,675 |
| Average firm stability (%)[b] | 93.9 | 75.6 |
| Growth rate in value added, 1964 to 1965 (%) | 10.1 | 7.6 |

Notes:

[a]Figures are unweighted means of industry data.

[b]Firm stability defined as percentage of industry employees remaining with their 1965 employer in 1966.

Source: Survey of Manufactures, 1965, Bureau of the Census, except stability, which is described in the text.

## III. STRUCTURE, INCOME, AND EXPERIENCE

The differential effects of three kinds of experience across structure can be analyzed by estimating income as a function of age, experience in the firm, and experience in the industry outside the firm. Firm-specific training is assumed to be dependent on the amount of firm experience, and industry-specific training similarly results from industry experience. Since specific training is explicitly accounted for, the effect of age on income is identified as general training -- that is, training that has value to other firms and industries and that the employee must therefore pay for.

The determination of the impact of experience on income should take account of the level of ability or education of the individual. Unfortunately, the Social Security data base, though rich in numbers of observations, is deficient in many other details, including education. To help overcome this deficiency, the sample was divided into high, medium and low income classes, and separate equations were estimated for each class.[1] This separation is intended to hold constant the combination of education, ability, personality, or other variables that might result in different incomes for individuals with the same amounts of experience. The classification of high, medium, or low income is made in the following way. An income equation as a function of age, firm experience, and industry experience was estimated from the large sample (equation 2, Appendix). An individual was then placed in the high income class if his actual income was more than $400 per quarter greater than his income as calculated from the overall equation. Likewise, low income individuals had an actual income $400 or more

[1] Income is reported for Social Security purposes only up to the maximum level on which Social Security taxes are paid. In 1965, this level was $4,800.00 per year. Thus, if an individual earned more than this amount in the first quarter, his income would be understated. This happened in 1.6 percent of the "small" sample and reached a maximum of 8.3 percent in one subsample. Truncation at the high end of the income range therefore is not a serious problem.

below the expected value; the medium group thus fell within the plus or minus $400 interval. An advantage of this classification scheme is that it recognizes the average effect of age and experience on income and makes distinctions based on deviations from the average. An alternative scheme is to designate simple dividing points such that anyone falling above a specified income level, say, $2,000 per quarter, is placed in the high income class. This technique is inferior to the chosen one in that it ignores the effect of variables known to influence income.

The discussion on training in the previous section specified certain probable relationships between training and structure: (1) firm-specific training is important in manorial industries; (2) firm-specific training is unimportant and industry experience is more important in guild industries; (3) neither firm nor industry experience has much effect in unstructured industries. As for general training, the earlier discussion on internal labor markets had little to offer. It was noted, though, that those in unstructured industries would be expected to be unskilled, implying little general training.

Income equations were estimated for the nine subsamples of high, medium, and low income individuals across the three structures. First quarter income for 1965 (thousands of dollars) was the dependent variable. The independent variables were converted to dummy variables with the estimated equation taking the following form:

$$Y = a_o + \Sigma b_i A_i + \Sigma c_j F_j + \Sigma d_k I_k$$

where $A_i$, $F_j$, and $I_k$ are dummy variables representing specific values (or ranges) of age, firm experience, and industry experience outside the firm (all measured in years).[1] The equation was estimated by both

[1] Both firm and industry experience have a maximum value of nine because the data are available for only ten years. The use of dummy variables in the equations (each experience level being a separate variable) indicates that income-experience profiles are fairly flat at nine years.

OLS and 2 SLS.[1] The qualitative results were the same in both cases.

The most surprising result from these equations is that, when income class (education, ability) is accounted for, the structural classes are barely distinguishable from each other by their equations. On the other hand, the income classes differ substantially. (The coefficients of the income equations of the three income classes are plotted in Figure 2 and shown as equations 3, 4, and 5 in the Appendix.) These points are reinforced by a comparison of the F statistics generated by the Chow test of difference between equations as shown in Table 4. The differences between the structural classes are quite insignificant relative to the differences between the income classes. These results do not agree with the predicted relationships discussed above. That is, the relationship between income and experience does not vary across structures (within income classes).[2] What does vary is the composition of the labor force. This point will be examined in more detail below.

Table 4

CHOW TESTS OF DIFFERENCES BETWEEN INCOME EQUATIONS

| Sample | Divided by: | F Statistic | Degrees of Freedom |
|---|---|---|---|
| Total "small" sample | Income class | 1155.0 | 24/8849 |
| Low income class | Structure | 10.2 | 24/3061 |
| Medium income class | Structure | 5.8 | 24/3891 |
| High income class | Structure | 2.5 | 24/1751 |

[1] Firm experience was estimated by instruments -- geographic region, firm size, and age -- and the estimated value inserted into the income equation.

[2] Industry experience is not very important for any of the subsamples and the coefficient estimates are unstable, as can be seen by a comparison of equations 3 and 6 or 5 and 7 in the Appendix.

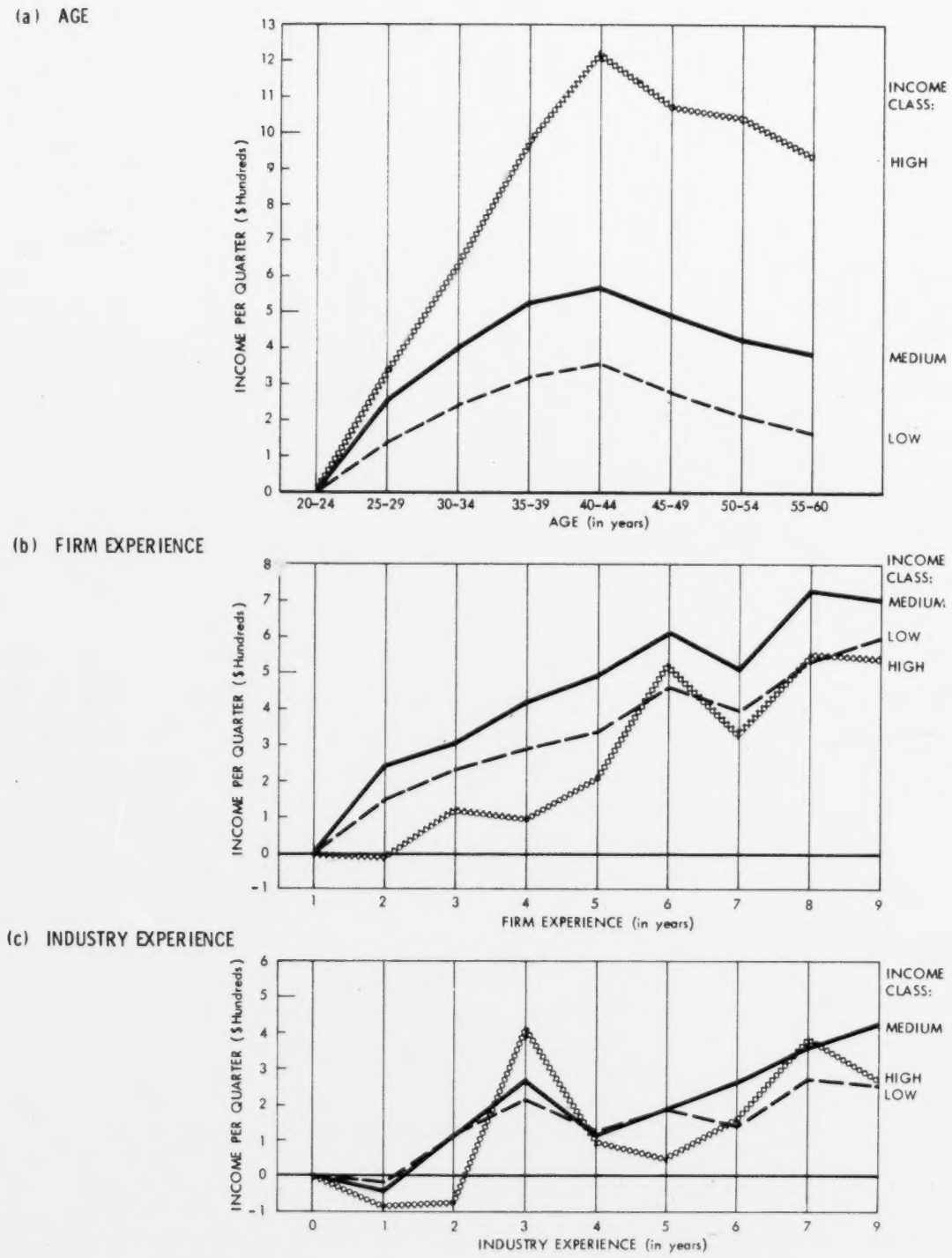


Figure 2. Effects of age and experience on income by income class.

The income-age profiles by income class (Figure 2) are quite similar to those derived by Hanoch for different educational levels.[1] Our high income class corresponds most closely to Hanoch's profiles for 16 or 17+ years of schooling, the medium income class to the 12 years' schooling group, and the low income class to the 8 years' schooling group. Whether these profiles actually reflect differences in education or differences in the individuals' ability to generalize experience is not known.

It is intriguing to observe that firm experience is both relatively and absolutely more important for both the medium and low income classes than for those with high income. The importance of general experience (age) for the high income individuals, and of firm experience at the lower end of the scale leads to some observable consequences. Recall that earlier it was shown that mobility falls sharply with firm experience for those in the lower income classes. We now see that the probable reason for this is the relatively great impact of firm experience and the non-transferable human capital embodied in this specific training. This conclusion is supported by additional evidence. The cross-effect of firm experience and age on income was examined for high and low income individuals (Figure 3 and Appendix equations 6 and 7). Low income individuals start at the bottom of the ladder in a new job regardless of age, whereas high income workers realize the benefit of their general experience even in their first year with a new employer.

The fact that those receiving general training are also at a higher income level suggests that general training is obtained by the more able.[2] A human capital model proposed by Rosen predicts such an

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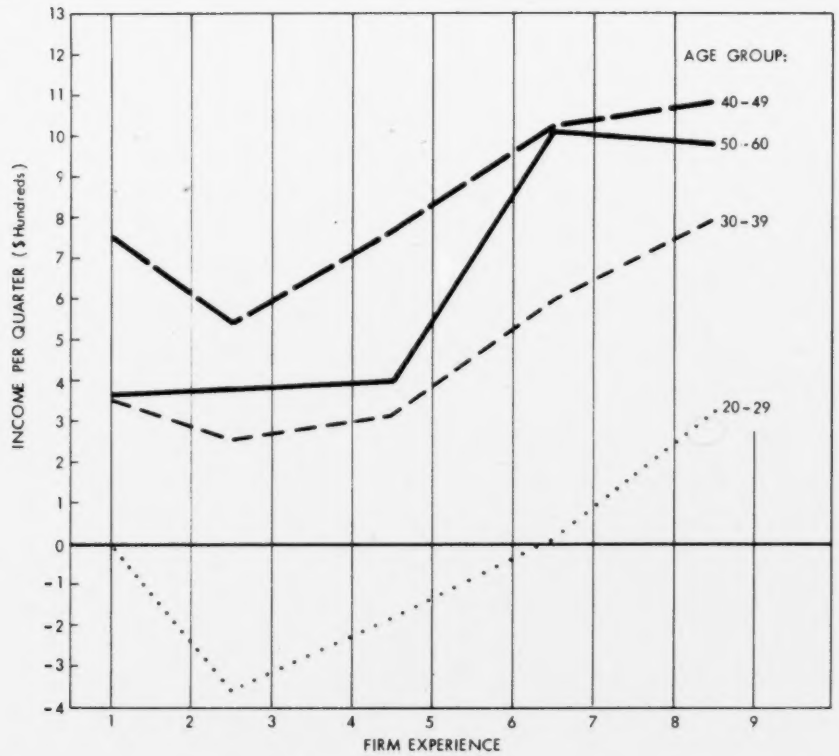
[1] Giora Hanoch, An Economic Analysis of Earnings and Schooling, The Journal of Human Resources, Vol. II, No. 3 (Summer 1967), p. 318.

[2] We use the phrase "more able" here to designate the congeries of traits that enable one to earn higher income, including access to investment funds, education, intelligence, personality, tastes, etc.

(a) HIGH INCOME




(b) LOW INCOME

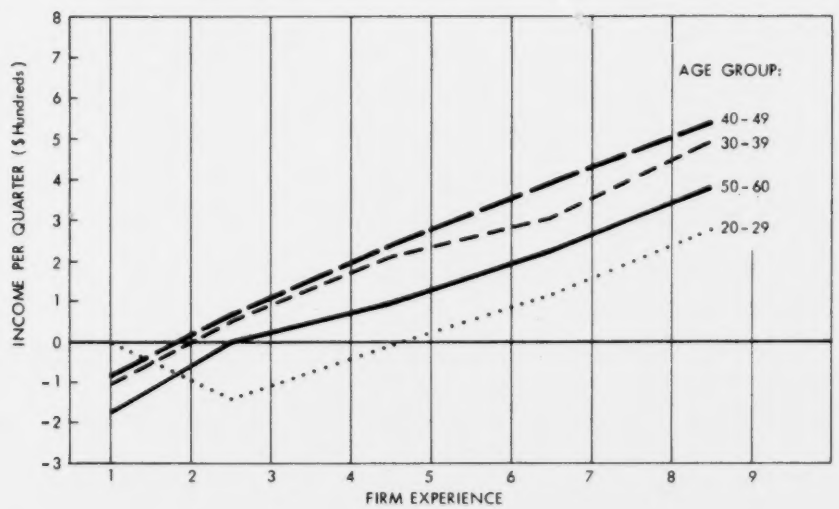



Figure 3. Effect of firm experience on income by age and income class.

outcome. If the returns to training are a function of ability, the price of general training would be such that those below a certain ability level would not find it profitable to purchase the training. We would therefore expect to find that "some classes of workers do not participate at all in certain job markets.[1]

Despite the similarity in income-experience patterns across structures for individuals in the same income class, structure does manifest itself in other ways -- chiefly through differences in labor force composition and in income distribution. Table 5 shows the income distribution of each structural class. The manorial industries are heavily weighted in the higher income classes, while a high proportion of the unstructured and guild industries are found in the lowest income class. This finding still holds after we account for the different mix of employee characteristics across structure. Table 6 shows the actual average income in each structure together with the income predicted by the large sample income equation. The positive deviation between actual and predicted income for the manorial industries suggests that they are getting a somewhat higher than average quality worker. These results are not at variance with what others have found. Weiss has shown that earnings are higher in concentrated industries.[2] These higher earnings are largely explained by the personal characteristics of the individual (education, age, etc.). Masters extended the analysis, and showed that plant size rather than concentration has the greater impact on earnings.[3] The concentrated industries with large firms are basically those classified here as manorial.

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[1] Sherwin Rosen, Learning and Experience in the Labor Market, unpublished paper, March 1971, p. 14.

[2] Leonard W. Weiss, "Concentration and Labor Earnings," American Economic Review, Vol. 56, No. 1, March 1966.

[3] Stanley H. Masters, "An Interindustry Analysis of Wages and Plant Size," Review of Economics and Statistics, Vol. 51, No. 3, August 1969.

Table 5

INCOME DISTRIBUTION BY STRUCTURE*
(Percent of Structure in Each Income Class)

| Structure | $2000-4000 | $4000-6000 | $6000-8000 | $8000-10000 | $10000+ |
|---|---|---|---|---|---|
| Manorial | 5.6 | 21.3 | 37.6 | 18.9 | 16.6 |
| Unstructured | 29.6 | 31.7 | 21.6 | 8.9 | 8.2 |
| Guild | 30.9 | 28.5 | 18.7 | 10.6 | 11.2 |

*1965 first quarter income at annual rate.

Table 6

ACTUAL AND PREDICTED AVERAGE INCOME BY STRUCTURE*

| Structure | Actual Average Income | Predicted Average Income |
|---|---|---|
| Unstructured | 1.980 | 1.839 |
| Manorial | 1.531 | 1.698 |
| Guild | 1.590 | 1.676 |

*1965 first quarter income in thousand dollars.

Newhouse has shown that the distribution of income in a region is largely determined by the mix of industries.[1] It is of interest to note that he ignored labor supply considerations in his analysis. Newhouse's reasoning is consistent with the empirical results of the present study. He conjectured that the lower income groups could be given firm-specific training to fit workers to the particular jobs required in a firm, while the mobility of higher income individuals enable them to move to where the jobs are. The small difference between the high income equations (Table 4) indicates that these labor markets are fairly uniform across structure, probably resulting from the conjectured mobility.

[1] Joseph P. Newhouse, "A Simple Hypothesis of Income Distribution," Journal of Human Resources, Vol, VI. No. 1.

We can conclude from this discussion that structure manifests itself through variations in the proportions of different types of individuals having pre-established income-experience traits, rather than through the imposition of behavioral patterns on an essentially homogeneous labor force.

## Appendix

## MOBILITY AND INCOME EQUATIONS

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Eq. 1: "Small" sample; n = 8919; $R^2$ = .20; S.E. = .372

$$M = .636 - \underset{(.017)}{.017A_2} - \underset{(.017)}{.023A_3} - \underset{(.017)}{.027A_4} - \underset{(.017)}{.048A_5} - \underset{(.017)}{.026A_6} - \underset{(.018)}{.056A_7} - \underset{(.018)}{.058A_8}$$

$$- \underset{(.025)}{.104Y_1F_{23}} - \underset{(.032)}{.303Y_1F_{45}} - \underset{(.039)}{.404Y_1F_{67}} - \underset{(.034)}{.452Y_1F_{89}} - \underset{(.035)}{.085Y_2F_1} - \underset{(.025)}{.267Y_2F_{23}}$$

$$- \underset{(.028)}{.418Y_2F_{45}} - \underset{(.031)}{.489Y_2F_{67}} - \underset{(.027)}{.541Y_2F_{89}} - \underset{(.042)}{.297Y_3F_1} - \underset{(.026)}{.340Y_3F_{23}} - \underset{(.029)}{.482Y_3F_{45}}$$

$$- \underset{(.031)}{.528Y_3F_{67}} - \underset{(.025)}{.549Y_3F_{89}} - \underset{(.062)}{.345Y_4F_1} - \underset{(.032)}{.335Y_4F_{23}} - \underset{(.034)}{.500Y_4F_{45}} - \underset{(.038)}{.520Y_4F_{67}}$$

$$- \underset{(.028)}{.566Y_4F_{89}} - \underset{(.058)}{.316Y_5F_1} - \underset{(.033)}{.356Y_5F_{23}} - \underset{(.037)}{.472Y_5F_{45}} - \underset{(.037)}{.536Y_5F_{67}} - \underset{(.027)}{.563Y_5F_{89}}$$

$$+ \underset{(.019)}{.052I_1} + \underset{(.021)}{.026I_2} + \underset{(.020)}{.034I_3} - \underset{(.025)}{.044I_4} + \underset{(.026)}{.027I_5} + \underset{(.028)}{.011I_6} - \underset{(.027)}{.055I_7}$$

$$- \underset{(.036)}{.140I_8} + \underset{(.015)}{.013S_2} - \underset{(.014)}{.004S_3} - \underset{(.017)}{.003S_4} - \underset{(.018)}{.025S_5} - \underset{(.016)}{.074S_6} - \underset{(.018)}{.076S_7}$$

$$- \underset{(.018)}{.062S_8} - \underset{(.015)}{.059R_2} - \underset{(.015)}{.083R_3} - \underset{(.017)}{.076R_4} - \underset{(.017)}{.079R_5} - \underset{(.018)}{.050R_6} - \underset{(.025)}{.026R_7}$$

$$+ \underset{(.018)}{.079R_8}$$

---

Eq. 2: "Large" sample; n = 14894; $R^2$ = .14; S.E. = .800

$$Y = .852 + \underset{(.028)}{.242A_2} + \underset{(.028)}{.390A_3} + \underset{(.028)}{.540A_4} + \underset{(.029)}{.603A_5} + \underset{(.029)}{.514A_6} + \underset{(.030)}{.437A_7} + \underset{(.031)}{.394A_8}$$

$$+ \underset{(.032)}{.224F_2} + \underset{(.034)}{.301F_3} + \underset{(.036)}{.384F_4} + \underset{(.038)}{.468F_5} + \underset{(.038)}{.619F_6} + \underset{(.041)}{.510F_7} + \underset{(.046)}{.698F_8} + \underset{(.032)}{.699F_9}$$

$$- \underset{(.033)}{.042I_1} + \underset{(.036)}{.118I_2} + \underset{(.035)}{.270I_3} + \underset{(.043)}{.133I_4} + \underset{(.047)}{.190I_5} + \underset{(.050)}{.238I_6} + \underset{(.049)}{.346I_7} + \underset{(.070)}{.421I_8}$$

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Eq. 3: Low income sample; n = 3133; $R^2$ = .48; S.E. = .236

$$Y = .415 + \underset{(.022)}{.133}A_2 + \underset{(.021)}{.233}A_3 + \underset{(.021)}{.315}A_4 + \underset{(.021)}{.354}A_5 + \underset{(.021)}{.277}A_6 + \underset{(.022)}{.213}A_7$$

$$+ \underset{(.022)}{.161}A_8 + \underset{(.020)}{.144}F_2 + \underset{(.023)}{.232}F_3 + \underset{(.023)}{.290}F_4 + \underset{(.025)}{.336}F_5 + \underset{(.024)}{.460}F_6 + \underset{(.026)}{.395}F_7$$

$$+ \underset{(.030)}{.535}F_8 + \underset{(.020)}{.600}F_9 - \underset{(.021)}{.019}I_1 + \underset{(.021)}{.112}I_2 + \underset{(.021)}{.214}I_3 + \underset{(.028)}{.129}I_4 + \underset{(.029)}{.187}I_5$$

$$+ \underset{(.033)}{.139}I_6 + \underset{(.026)}{.275}I_7 + \underset{(.041)}{.255}I_8$$

---

Eq. 4: Medium income sample; n = 3963; $R^2$ = .71; S.E. = .220

$$Y = .796 + \underset{(.012)}{.255}A_2 + \underset{(.013)}{.400}A_3 + \underset{(.014)}{.528}A_4 + \underset{(.014)}{.570}A_5 + \underset{(.015)}{.495}A_6 + \underset{(.016)}{.425}A_7$$

$$+ \underset{(.016)}{.387}A_8 + \underset{(.015)}{.244}F_2 + \underset{(.017)}{.306}F_3 + \underset{(.018)}{.415}F_4 + \underset{(.019)}{.497}F_5 + \underset{(.021)}{.619}F_6 + \underset{(.021)}{.514}F_7$$

$$+ \underset{(.028)}{.730}F_8 + \underset{(.016)}{.703}F_9 - \underset{(.016)}{.037}I_1 + \underset{(.020)}{.107}I_2 + \underset{(.019)}{.267}I_3 + \underset{(.022)}{.118}I_4 + \underset{(.023)}{.187}I_5$$

$$+ \underset{(.024)}{.262}I_6 + \underset{(.027)}{.365}I_7 + \underset{(.031)}{.429}I_8$$

---

Eq. 5: High income sample; n = 1823; $R^2$ = .34; S.E. = .737

$$Y = 1.784 + \underset{(.077)}{.340}A_2 + \underset{(.079)}{.637}A_3 + \underset{(.079)}{.970}A_4 + \underset{(.079)}{1.224}A_5 + \underset{(.082)}{1.073}A_6 + \underset{(.084)}{1.035}A_7$$

$$+ \underset{(.085)}{.934}A_8 - \underset{(.086)}{.004}F_2 + \underset{(.096)}{.115}F_3 + \underset{(.097)}{.099}F_4 + \underset{(.102)}{.208}F_5 + \underset{(.106)}{.526}F_6 + \underset{(.113)}{.321}F_7$$

$$+ \underset{(.124)}{.544}F_8 + \underset{(.090)}{.541}F_9 - \underset{(.088)}{.083}I_1 + \underset{(.094)}{.071}I_2 + \underset{(.089)}{.409}I_3 + \underset{(.101)}{.100}I_4 + \underset{(.111)}{.053}I_5$$

$$+ \underset{(.124)}{.158}I_6 + \underset{(.110)}{.375}I_7 + \underset{(.165)}{.260}I_8$$

---

Eq. 6: Low income sample; n = 3133, $R^2$ = .45; S.E. = .243

$$Y = \underset{(.022)}{.811} - \underset{(.022)}{.022}I_1 + \underset{(.021)}{.089}I_2 + \underset{(.029)}{.215}I_3 + \underset{(.030)}{.140}I_4 + \underset{(.034)}{.181}I_5 + \underset{(.030)}{.168}I_6$$

$$+ \underset{(.042)}{.251}I_7 + \underset{(.031)}{.239}I_8 - \underset{(.036)}{.143}A_{20}F_{23} - \underset{(.041)}{.011}A_{20}F_{45} + \underset{(.045)}{.117}A_{20}F_{67}$$

$$+ \underset{(.041)}{.275}A_{20}F_{89} - \underset{(.031)}{.105}A_{30}F_1 + \underset{(.034)}{.044}A_{30}F_{23} + \underset{(.036)}{.207}A_{30}F_{45} + \underset{(.031)}{.303}A_{30}F_{67}$$

$$+ \underset{(.040)}{.489}A_{30}F_{89} - \underset{(.031)}{.086}A_{40}F_1 + \underset{(.035)}{.062}A_{40}F_{23} + \underset{(.035)}{.232}A_{40}F_{45} + \underset{(.030)}{.390}A_{40}F_{67}$$

$$+ \underset{(.045)}{.532}A_{40}F_{89} - \underset{(.033)}{.174}A_{50}F_1 - \underset{(038)}{.001}A_{50}F_{23} + \underset{(.038)}{.092}A_{50}F_{45} + \underset{(.031)}{.230}A_{59}F_{67}$$

$$+ \underset{}{.378}A_{50}F_{89}.$$

Eq. 7: High income sample; n = 1823; $R^2$ = .30; S.E. = .756

$$Y = \underset{(.089)}{2.371} - \underset{(.097)}{.101}I_1 - \underset{(.089)}{.086}I_2 + \underset{(.103)}{.478}I_3 + \underset{(.112)}{.148}I_4 + \underset{(.127)}{.092}I_5 + \underset{}{.220}I_6$$

$$+ \underset{(.175)}{.381}I_7 + \underset{(.102)}{.236}I_8 - \underset{(.122)}{.360}A_{20}F_{23} - \underset{(.157)}{.182}A_{20}F_{45} + \underset{(.209)}{.011}A_{20}F_{67}$$

$$+ \underset{(.162)}{.320}A_{20}F_{89} + \underset{(.108)}{.354}A_{30}F_1 + \underset{(.117)}{.259}A_{30}F_{23} + \underset{(.128)}{.317}A_{30}F_{45} + \underset{(.110)}{.599}A_{30}F_{67}$$

$$+ \underset{(.197)}{.796}A_{50}F_{89} + \underset{(.113)}{.753}A_{40}F_1 + \underset{(.126)}{.543}A_{40}F_{23} + \underset{(.129)}{.769}A_{40}F_{45} + \underset{(.104)}{1.024}A_{40}F_{67}$$

$$+ \underset{(.189)}{1.086}A_{40}F_{89} + \underset{(.129)}{.365}A_{50}F_1 + \underset{(.144)}{.380}A_{50}F_{23} + \underset{(.150)}{.396}A_{50}F_{45} + \underset{}{1.013}A_{50}F_{67}$$

$$+ \underset{(.104)}{.981}A_{50}F_{89}$$

Note: All independent variables are 0-1 dummies. Standard errors are in parentheses.

## VARIABLES

| Age (years) | Firm Experience (years) | Industry Experience Outside the Firm (years) |
|---|---|---|
| $A_2$ = 25-30 | $F_1$ = 1 | $I_1$ = 1 |
| $A_3$ = 30-35 | $F_2$ = 2 | $I_2$ = 2 |
| $A_4$ = 35-40 | $F_3$ = 3 | $I_3$ = 3 |
| $A_5$ = 40-45 | $F_4$ = 4 | $I_4$ = 4 |
| $A_6$ = 45-50 | $F_5$ = 5 | $I_5$ = 5 |
| $A_7$ = 50-55 | $F_6$ = 6 | $I_6$ = 6 |
| $A_8$ = 55-60 | $F_7$ = 7 | $I_7$ = 7 |
| $A_{20}$ = 20-30 | $F_8$ = 8 | $I_8$ = 8 |
| $A_{30}$ = 30-40 | $F_9$ = 9 | |
| $A_{40}$ = 40-50 | $F_{23}$ = 2-3 | |
| $A_{50}$ = 50-60 | $F_{45}$ = 4-5 | |
| | $F_{67}$ = 6-7 | |
| | $F_{89}$ = 8-9 | |

| Income (annual, $) | Firm Size (number of employees) | Raise (%, 1965 income/1964 income-1) |
|---|---|---|
| $Y_1$ = 2000-4000 | $S_2$ = 50-100 | $R_2$ = -10-0 |
| $Y_2$ = 4000-6000 | $S_3$ = 100-250 | $R_3$ = 0-5 |
| $Y_3$ = 6000-8000 | $S_4$ = 250-500 | $R_4$ = 5-10 |
| $Y_4$ = 8000-10000 | $S_5$ = 500-1000 | $R_5$ = 10-20 |
| $Y_5$ = >10000 | $S_6$ = 1000-2500 | $R_6$ = 20-50 |
| | $S_7$ = 2500-5000 | $R_7$ = 50-100 |
| | $S_8$ = >5000 | $R_8$ = >100 |

### Dependent Variables

M = Firm Mobility (1 if moved, 0 otherwise)

Y = Income (1965 first quarter, thousands)